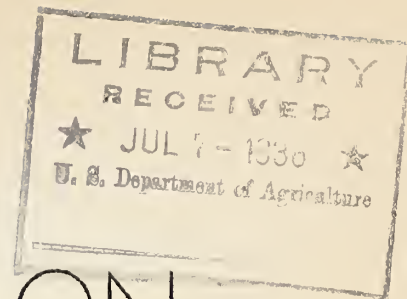


Historic, archived document

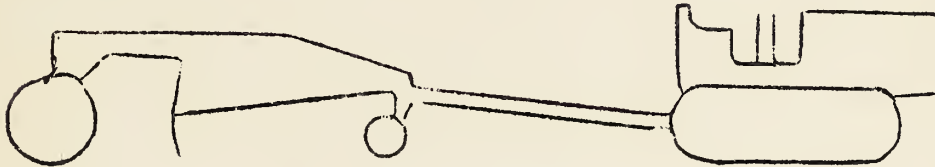
Do not assume content reflects current scientific knowledge, policies, or practices.

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CONSTRUCTION



HINTS

UNITED STATES DEPARTMENT OF AGRICULTURE, FOREST SERVICE

Vol. 2

Washington, D. C.

June 27, 1936.

No. 13

Starting Heavy Equipment During Cold Weather
By Wilfred S. Davis, Project Superintendent, Camp F-14,
Lightning Creek - Region 2

During the last winter considerable difficulty was experienced in starting heavy equipment, particularly gasoline tractors, on cold mornings. To overcome this, the following plan was devised:

A piece of old culvert the same length as the tractor was buried in the ground to a depth of six inches over the top, with an open pit at each end. A wood fire was kept burning in this during the day, warming the ground in all directions. At the end of the day's work all flaming wood was raked out, and the culvert ends were sealed up with rock and earth. The tractor was then parked over the culvert, the tracks parallel with it; and throughout the night the machinery, particularly transmission and crankcase, were kept warm by the radiating heat. On the following morning starting was easy, even at temperatures colder than 30 degrees below zero, and moisture condensation was greatly reduced.

As a safety precaution, the gasoline tank was always drained, and care was taken that no oil or grease drippage occurred.

U. S. F O R E S T S E R V I C E

R E G I O N 5

SAN FRANCISCO, CALIFORNIA

* * *

S H O P P R A C T I C E

covering

C H A N G E S, R E P A I R S and O V E R H A U L

of

T R A C T O R S

(It is suggested that shop foremen and
mechanics keep a folder of this and
similar material for reference
and use in equipment overhaul
and repair)

The changes, as described in the attached memoranda and drawings, were adopted as a result of findings in the use and overhaul of TRACTORS.

These practices have been developed by various National Forest Headquarters shops in conjunction with the Bureau of Public Roads shops and the Region 5 Transportation Office at Government Island, Oakland, California.

Field tests have been conducted largely by the Transportation Office on a special experimental tractor maintained for that purpose and the recommended changes have been proved in the field under actual service conditions.

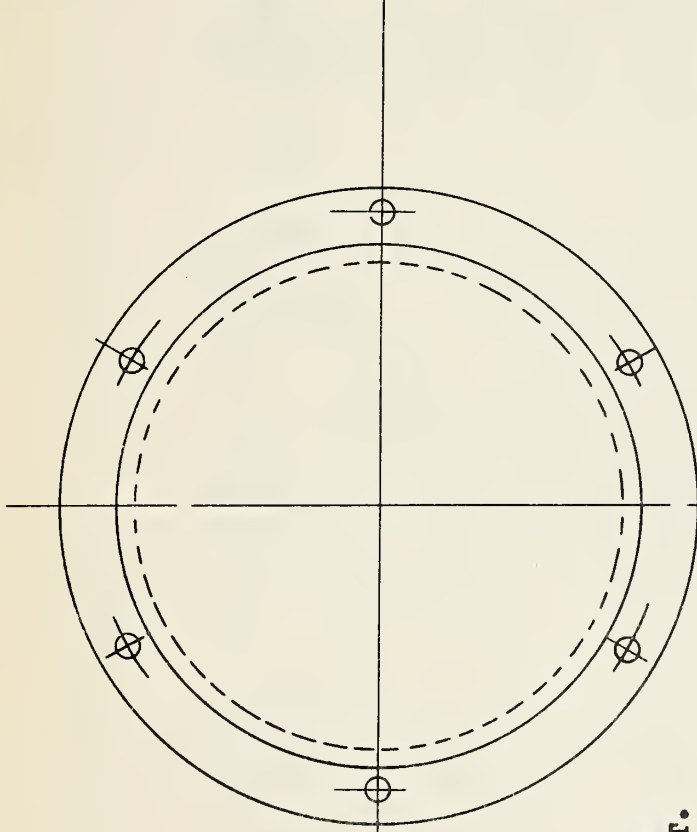
Some of the following described changes result in more efficient operation of the machine, others in longer wear and, in nearly all cases, reduced repair costs.

The Caterpillar "50" has given considerable trouble in the steering clutches, due to the oil or grease working from the final drive compartment into the clutch compartment along the pinion gear shafts.

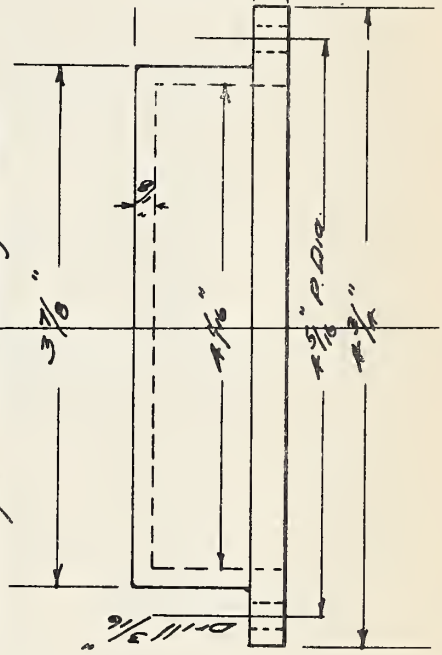
Many attempts have been made to correct this by the use of special clutch facings that are impervious to oil - such as the bi-metallic type of lining.

This trouble has been quite easily remedied by the use of the grease retainer shown at the RIGHT.

Cost is about \$8.00



Oil seal for Cat. Steering clutch



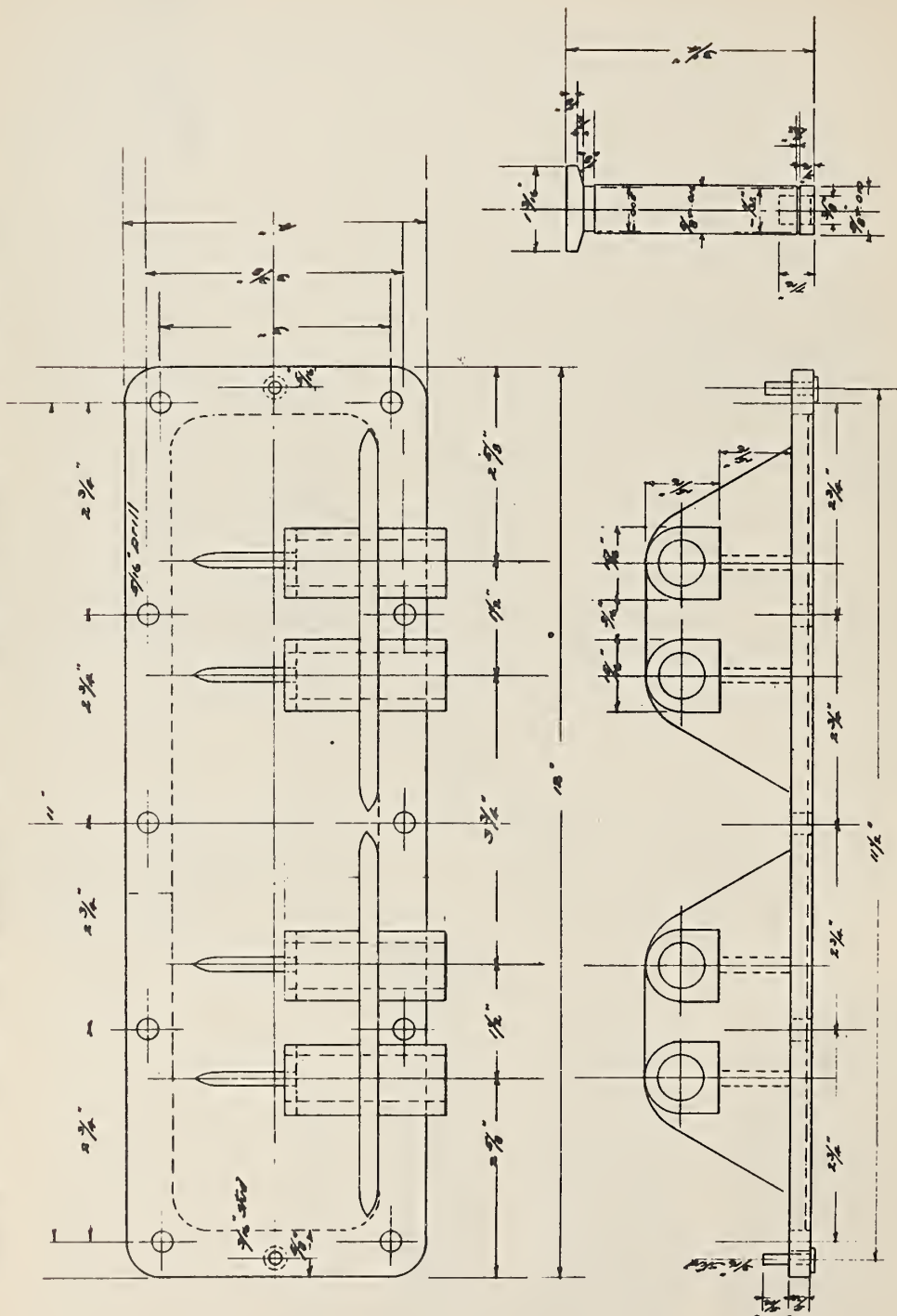
70-109

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5

OIL SEAL FOR CAT. STEERING CLUTCH

TRANSPORTATION SHORE GOVERNMENT ISLAND
DESIGNED E.L.M. 11/11
DRAWN M.S.R.
TRACED M.S.R.
APPROVED E.L.M. 11/11

Worn valve tappet assemblies of the Wisconsin motor are salvaged by boring and reaming the tappet guides and installing oversized tappets as shown below.



Material white metal

70-110

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

REGION 5

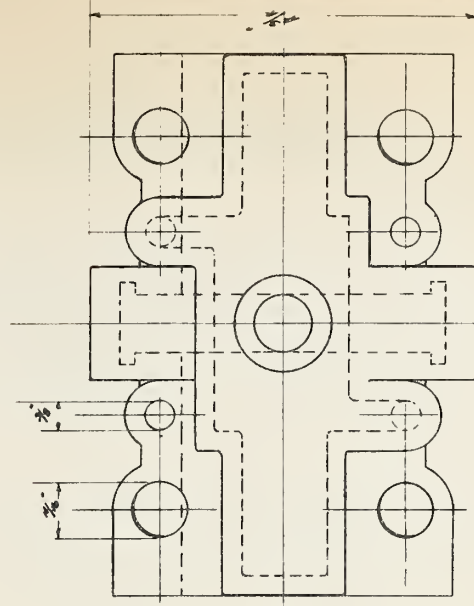
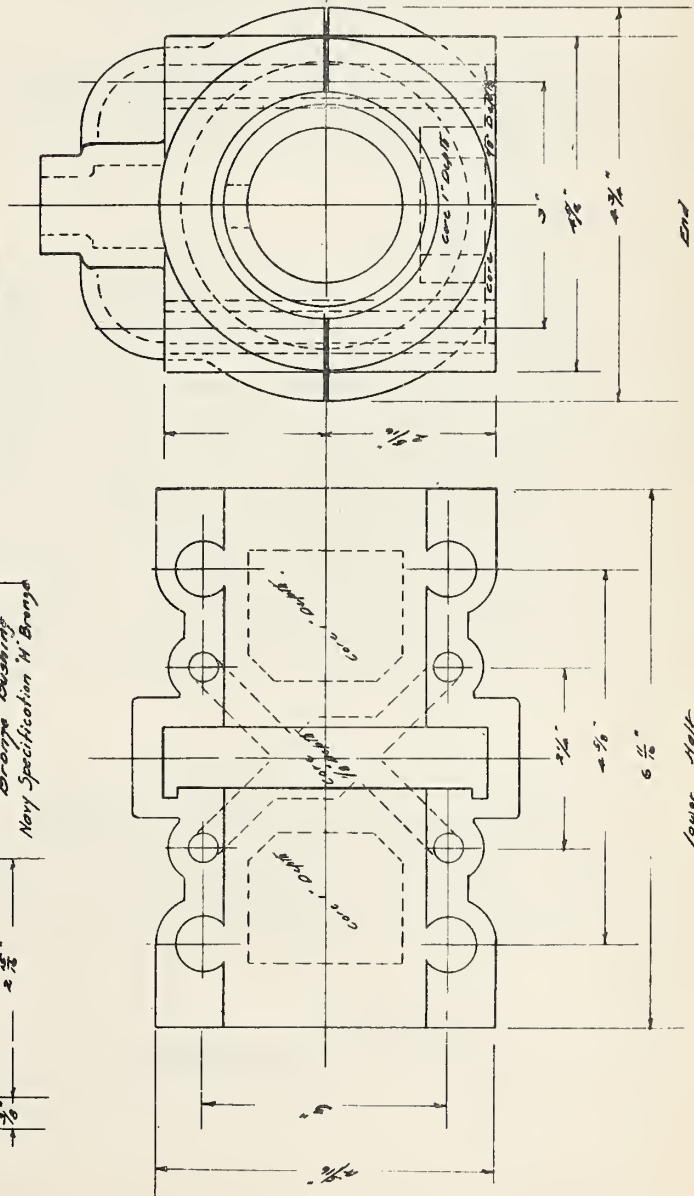
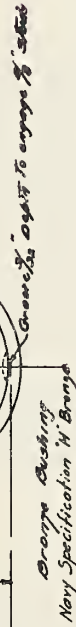
TAPPET ASSEMBLY-SS CAT.

TRANSPORTATION SHOP GOVERNMENT BUILDING

DESIGNED

DRAWN

FILED



Top TQ-111

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5
WASHO COUNTY, WASHINGTON
TRANSPORTATION SHOW-GOVERNMENT ISLAND
DESIGNED MUSTER & HETT
DRAWN M.S.P.
TRACED
APPROVED 5/2/44

Cletrac "55" worn front wheel bearing assemblies are salvaged in the same manner as the lower wheel bearings.

LOWER TRACK WHEEL BEARING, CLETRAC "55"

COMPLAINT OR FAILURE:

The lower track wheel bearing on the Cletrac is not of the anti-friction type, and since the wearing surfaces are steel to cast-iron, and also, with the additional weight of the trailmaker, the more or less positive method of lubrication has caused a considerable amount of wear and repair on this bearing. The standard Cletrac bearing is made in two halves and is sometimes rather difficult to seal against oil leakage.

A better type of plain bearing was therefore desired. Considerable experimentation has been carried on in designing a bronze bearing on the steel shaft, and over a period of two years the results have been very encouraging; yet the pile of worn Cletrac bearings and shafts was rapidly increasing, and represented an investment to the Service of several thousands of dollars.

Since a large percentage of discarded bearings and shafts were serviceable except for worn bearing surfaces, considerable effort was expended on the salvage of these parts. This was finally accomplished in the following manner:

REPLACEMENT & REMEDY:

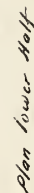
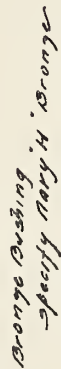
The two halves of the worn bearing were assembled and bored to 2-1/2 inches internal diameter. A bronze bushing of high tin content was then turned to fit the bearing, which was bored to 1-31/32 inches or 1/32 smaller than the standard Cletrac shaft, plus .010 for clearance. No dowels are used, since the distance between the bolt holes in the bearing is less than the outside diameter of the bushing. It is necessary to run a drill through the stud holes of the assembly - by so doing, a groove is cut in the bushing. (This prevents the movement of the bushing when the bearing is installed on the track frame studs.) Since the oil seal contacts a single bronze surface instead of the broken surface of the two halves, no difficulty has been experienced at this point. The shafts that are serviceable except for worn bearing surfaces are then ground between centers to 1/32 of an inch undersize, and installed in the bearing assembly.

COST:

The cost of the new standard Cletrac bearing is \$10.00, shaft \$7.00. We are reconditioning the bearing assembly, together with the shaft and furnishing the bronze bushing at a cost of \$8.49. (Including procurement & handling charges.) We feel that this job will be far superior to the original assembly and at the same time a saving of \$8.51 will be realized.

PRINTS:

Details are shown on the accompanying prints. (PAGE 7)



End elevation

Redesigned Assembly Lower Bearing + Shaft. Part 3 + 1129. + 40285-

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

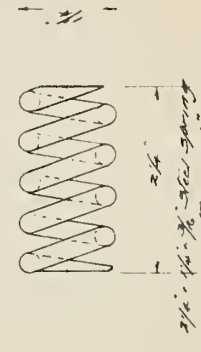
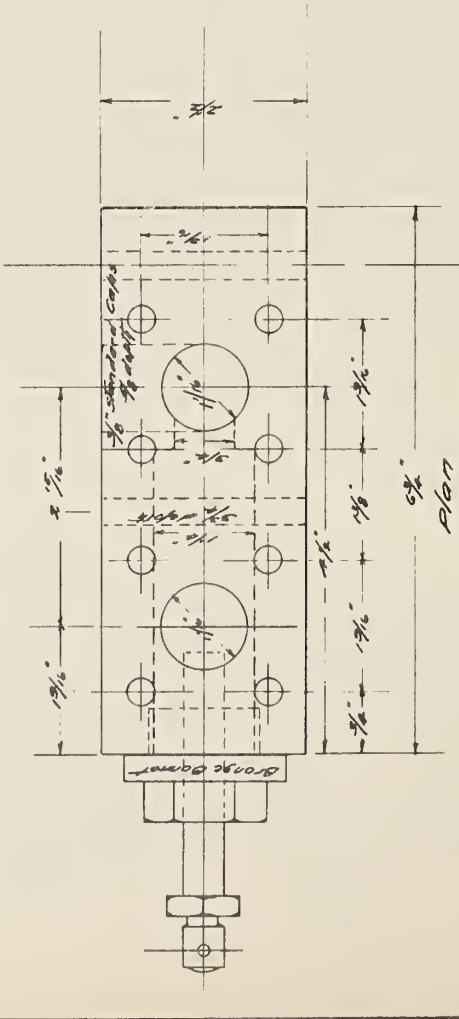
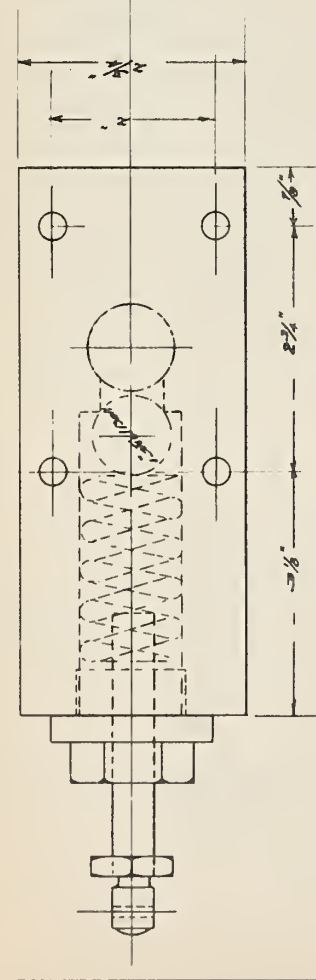
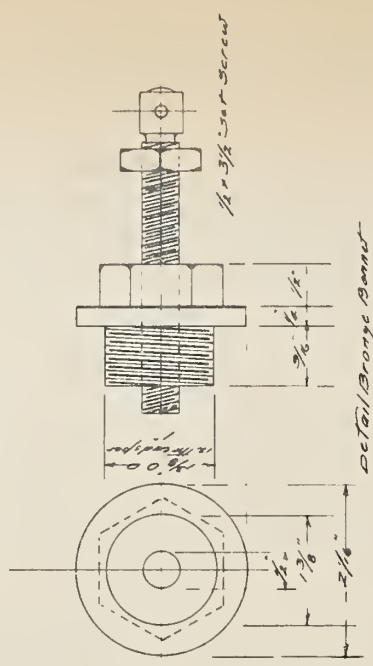
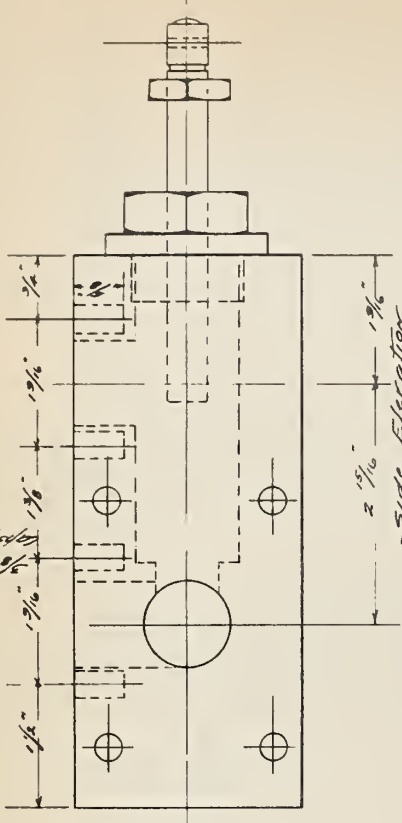
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RECEIVED LOWRY LIBRARY

TRANSPORTATION SHORT GOVERNMENT ISLAND
DESIGNED - MURTEN 6 HIETT

DRAWN BY J. P.
TRACED

1/8" standard
1/8" depth

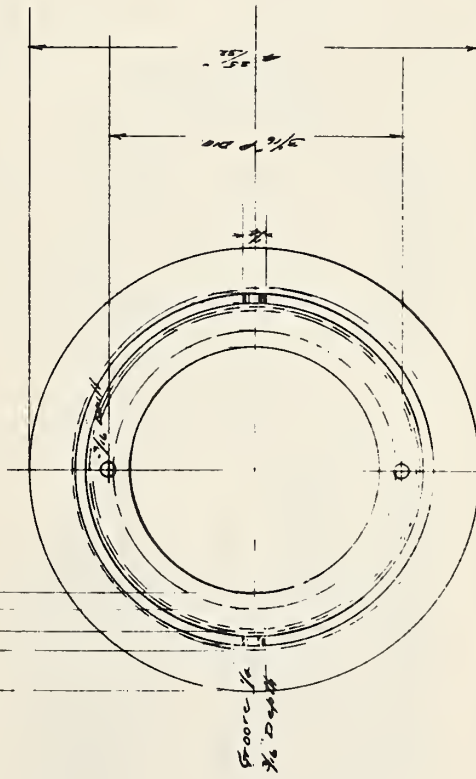
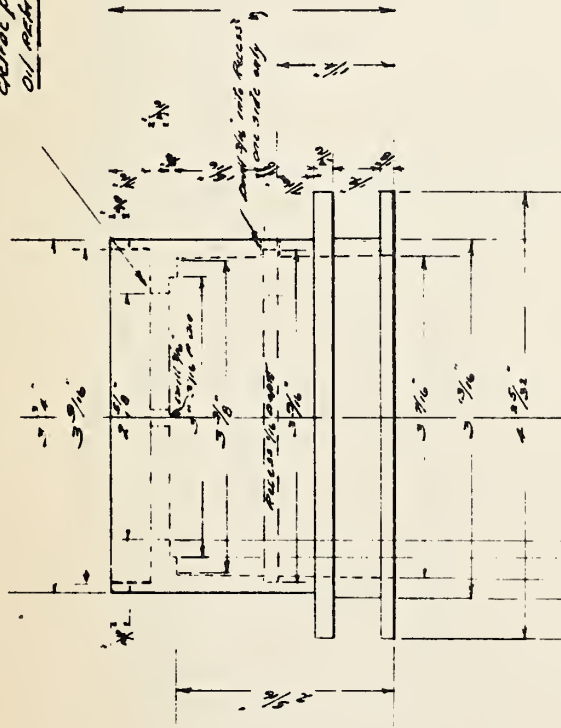


The control valve of the old type Isaacson Trailmaker is a complicated and expensive valve to maintain. On the other hand, the valve of the Wooldridge is exceedingly simple and fairly efficient in its operation. Therefore it was decided to make an adapter whereby the Wooldridge valve could be installed on the Isaacson pump. A bypass valve was incorporated at a cost of about \$7.50.

T.O.-115

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5
ADAPTER FOR ISAACSON PUMP
WOOLDRIDGE CONTROL VALVE
DESIGNED-BUILT TRANSPORTATION GROUP
GOVERNMENT ISLAND
DRAFTED H.S.A.
CHECKED H.S.A.
APPROVED

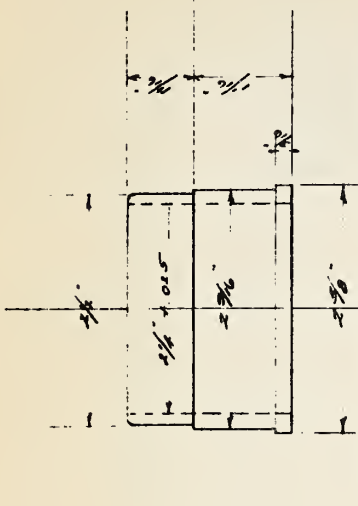
detrac part 40136
oil retractor



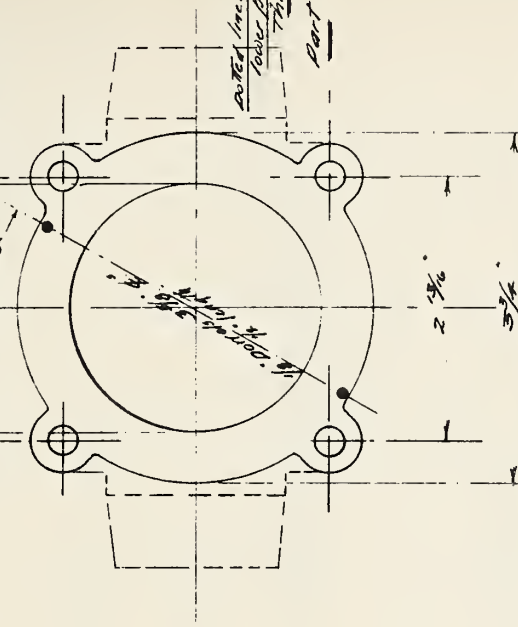
Clutch Retractor Collar finished
from Mall Steel casting

The retractor collar on the Cletrac has given some trouble, principally because of lack of lubrication.

When trouble occurred in the clutch, difficulty was experienced in shifting gears and the corners of the teeth of the gears were prematurely worn away. The above collar was adopted.



Sleeve for Thru-bolt Bearing Cap Cover



Cap Cover bolts to Cap. Drill for 1/8 Dowels
which centered as per detail. Sleeve to
run free with assembly Part 42220

Noted lines indicate
Lower Part of casting
Thru-bolt Bearing
Part 42220

7.0-117

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION
SLEEVE FOR THRU-BOLT BEARING CAP COVER
CLUTCH RETRACTOR COLLAR APR 42223
TRANSPORTATION 40-33 GOVERNMENT 134912

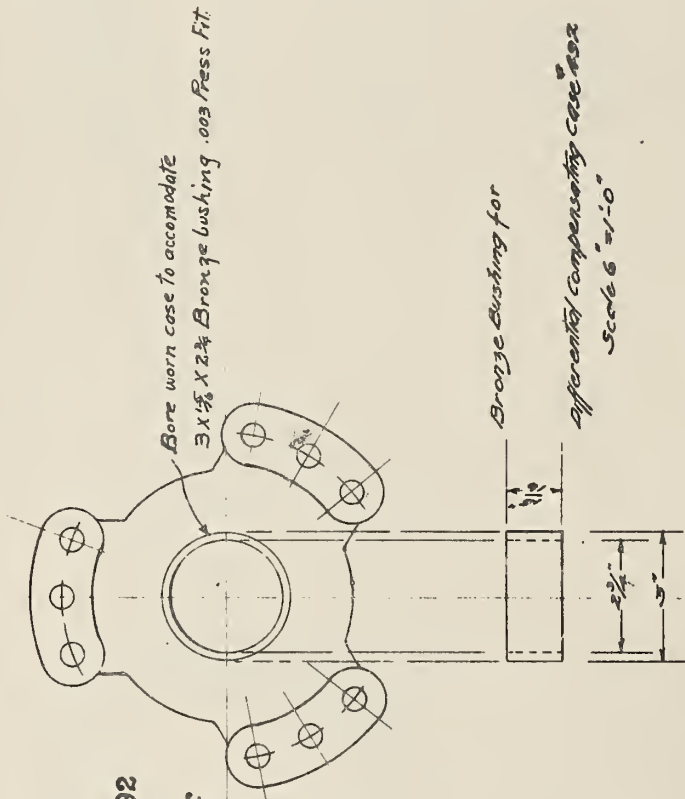
DESIGNED
DRAWN
CHECKED
SCALE FULL SIZE

1/2

COMPENSATING CASE BUSHING FOR CLETRAC "55"

The bearing surfaces from the differential compensating case Part #492 to the drive shaft, are "steel to steel". The wear at this point is sometimes considerable.

The compensating case spider is bored out, and a bronze bushing pressed in place. The cost is about \$2.50.



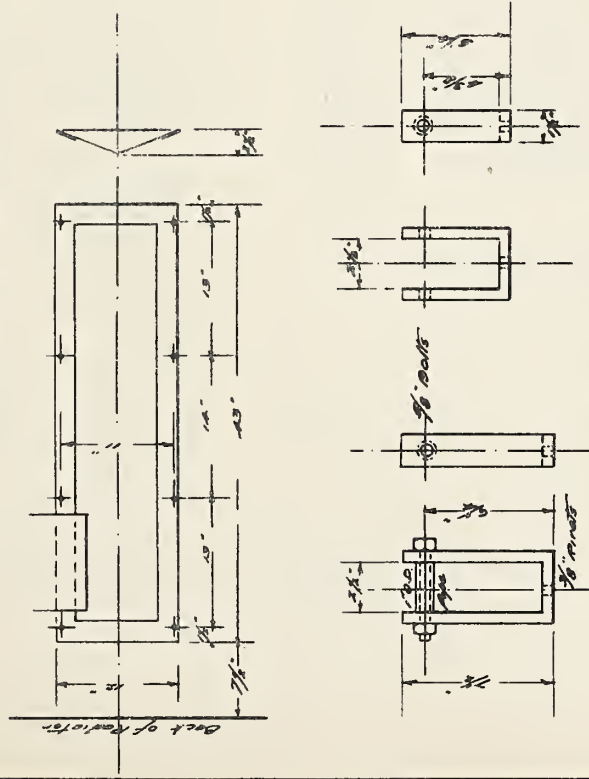
70-118

US DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION-5
Bronze Bushing to replace Bearing
Steel 18 1/2 in.
Differential Compensating Case #492
Drawn M.S.R.
Traced M.S.R.
Checked
Approved

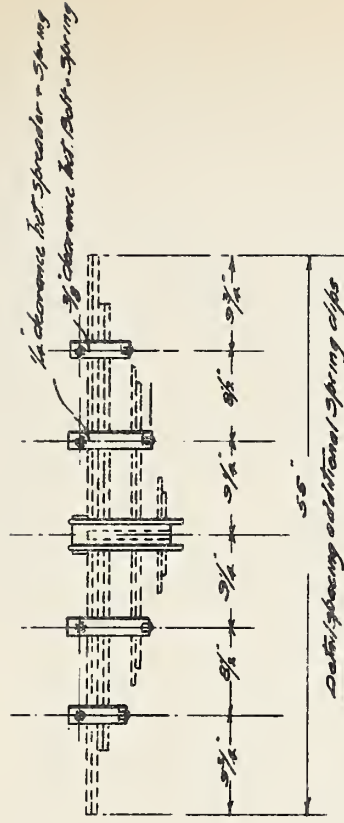
FRONT SPRING CLIPS FOR CLETRAC "55"

The Cletrac 40-55 is equipped with only two spring clips on the front springs. Trailmaker work is especially severe on the front springs, consequently the spring leaves themselves, shift.

The remedy is to install two additional spring clips. Details are shown below.



Detail Spring clips 1/2 x 1/2 x 1/2



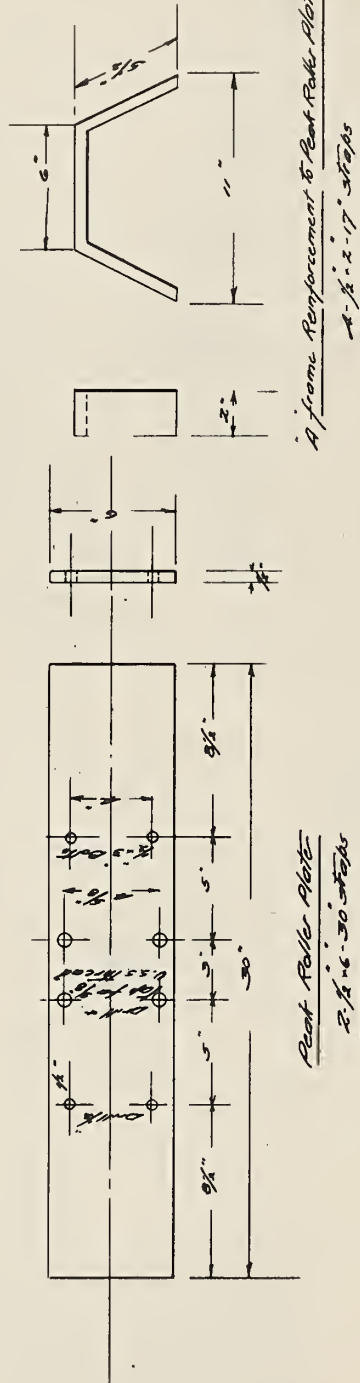
Detail Spring clips 1/2 x 1/2 x 1/2

70-119

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION 5
DETAIL MOOD COVER SPRING CLIPS
SAGGING ADDITIONAL SPRING CLIPS
TRANSMITTAL TO SHOW GOVERNMENT / ISLAND
DRAFT 10.3.19
TRACED 10.3.19
CHECKED
APPROVED

UPPER TRACK WHEEL BEARING ASSEMBLY FOR CLETRAC "55"

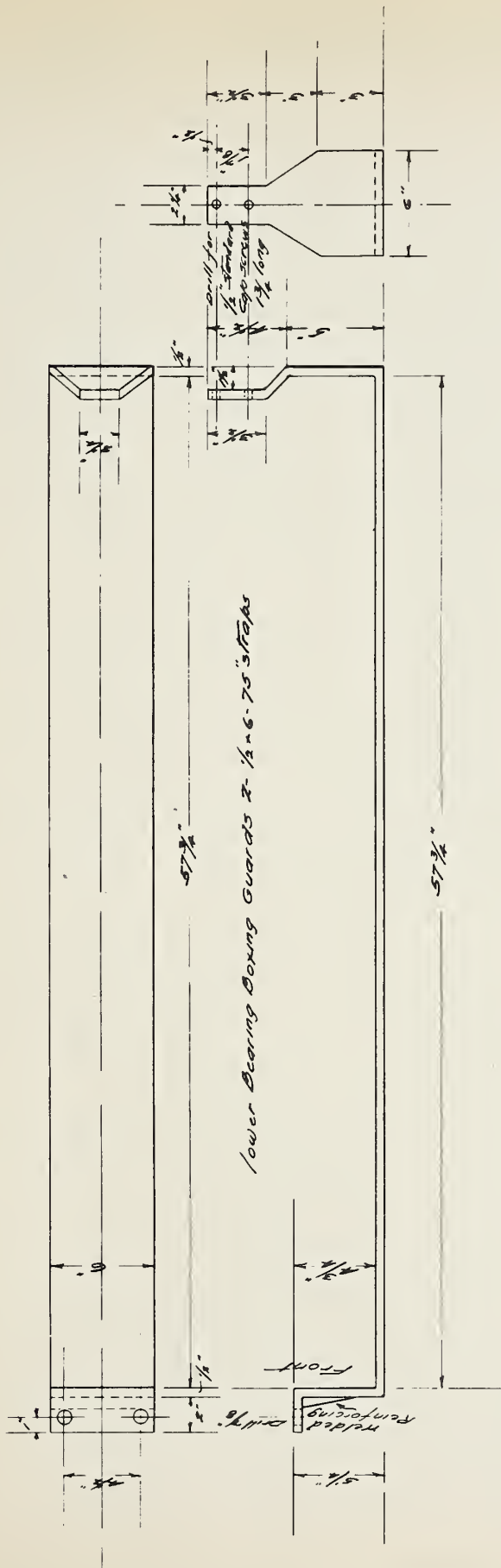
The Cletrac "40" and "55" have three small plain type upper track carriers that have no flanges to guide the track. In almost every case of major overhaul the rollers and bearings are found to be considerably worn.



As all models of the Cletrac have flanged upper track bearings, it was decided to replace the three present rollers with a single roller assembly which is interchangeable with the lower track wheel assembly. This is accomplished by mounting it on a plate 1 1/2" x 6" x 30" with the standard track frame studs, and which is in turn bolted to the top of the side frame housing. The reconditioned lower bearing and shaft is used, but as the load upon it is not as great as it would be in its original location, a slightly worn flanged wheel may be used, and has been found to be fully as serviceable as a new wheel. The cost is the same for the bearing and shaft assembly as for the lower wheel, but the wheels are salvaged from used parts.

Dimensions of the base plate with stud locations are shown above.

70-120



LOWER WHEEL BEARING GUARD FOR CLETRAC #55"

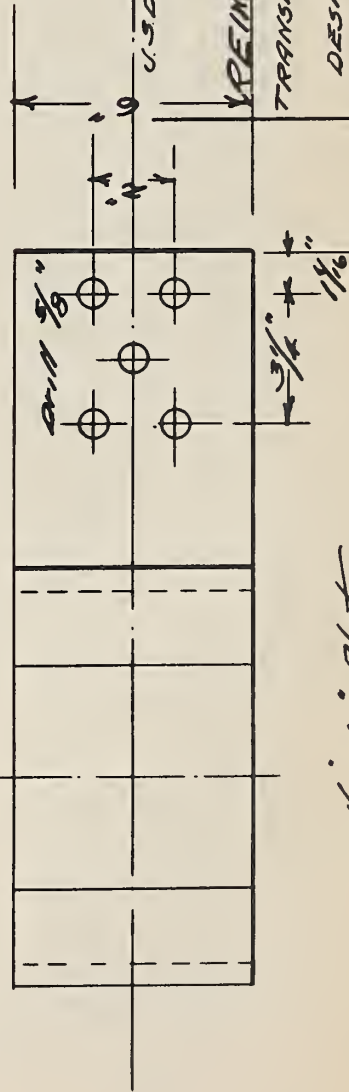
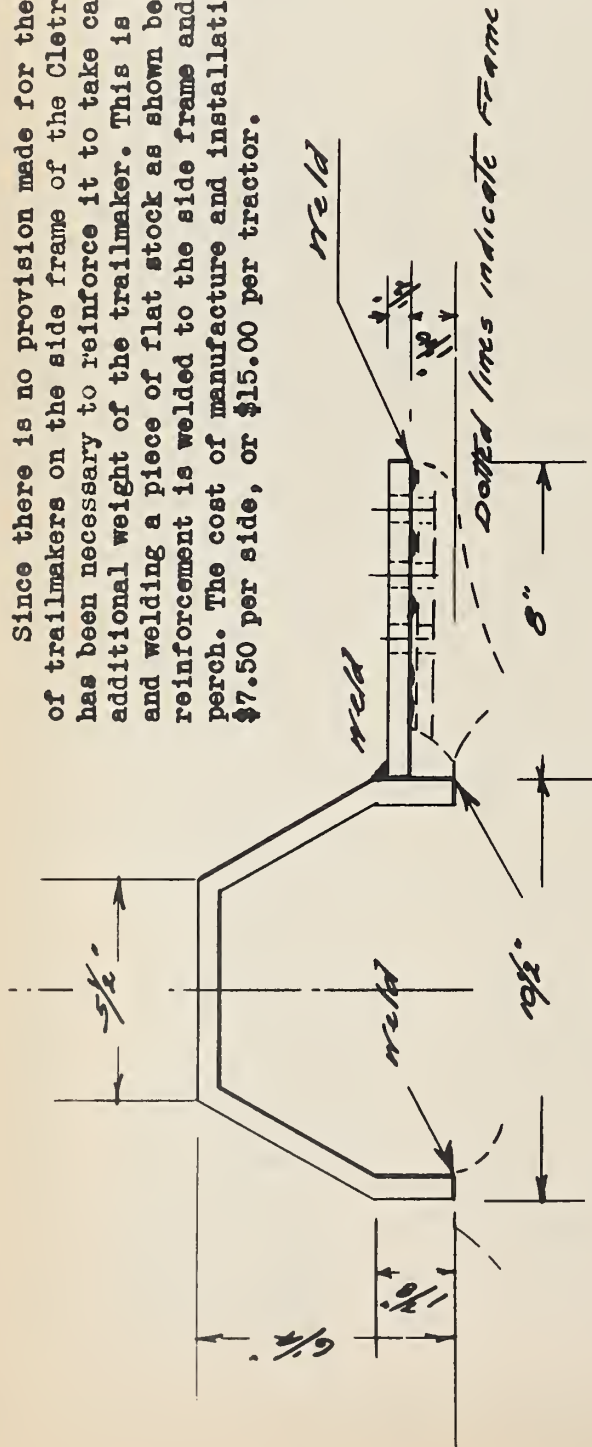
The regular lower wheel bearing guard as furnished by the Cleveland Tractor Company is bored to accommodate the socket wrench for tightening the lower wheel bearing nuts, and the cost is \$16.80. It is quite apparent that when the tractor is working in broken rock, a great deal of wear occurs both on the track and the bearing guard itself because of the fact that rock particles which are carried around the track will catch in these holes. Since no holes are provided for the tightening of each individual nut, it is of course necessary to remove the guard for periodical inspection and tightening; however it is felt that the labor involved is justified.

In an attempt to eliminate some of these difficulties, a plain type $1\frac{1}{2}$ " x 6" bearing guard is furnished. Details are shown above.

70-122

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION - 5
LOWER BEARING BOXING GUARD
DESIGNED - BUILT TRANSPORTATION SHOP
GOVERNMENT ISLAND
DRAFT M3P
TRACED M3P
CHECKED
APPROVED

Since there is no provision made for the installation of trailmakers on the side frame of the Cletrac "55", it has been necessary to reinforce it to take care of the additional weight of the trailmaker. This is done by forming and welding a piece of flat stock as shown below. This reinforcement is welded to the side frame and to the spring perch. The cost of manufacture and installation is about \$7.50 per side, or \$15.00 per tractor.



Reinforcement Side Frame to Spring Perch.

T.O. 123

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

REGION - 5

REINFORCEMENT FOR 55 CLETRAC
SIDE FRAME TO Spring Perch
TRANSPORTATION SHOES GOVERNMENT ISLAND

DESIGNED E.L. HALL

DRAWN M.J.R.

TRACED

APPROVED